UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/639,144	08/11/2003	**Chun Chian Lu**	06720.0104-00	7607

22852 7590 03/17/2009

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP
901 NEW YORK AVENUE, NW
WASHINGTON, DC 20001-4413

EXAMINER	
PUENTE, EVA Y	

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
03/17/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/639,144	LU, CHUN CHIAN	
	Examiner	Art Unit	
	EVA Y. PUENTE	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 December 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-12 and 14-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-12 and 14-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 12/3/08 have been fully considered but they are not persuasive. Examiner has thoroughly reviewed Applicant's arguments but firmly believes that the cited reference reasonably and properly meet the claimed limitation as rejected.

Applicant's argument – Wei et al does not teach or suggests "extracting an approximation of the pulse shaping distortion, comprising applying an equalization between the second and a third signal corresponding to the first signal, the third signal including no pulse shaping distortion and consisting only of binary code division, multiple access (CDMA) codes" as recited in claim 1.

Examiner's response – It appears that applicant misunderstood examiner's rejection. Hafeez et al disclose a receiver system for receiving a first wireless communication signal (102 in Fig. 2). It is inherent that the first signal including pulse shaping distortion produced by pulse shaping. Extracting an approximation of the pulse shaping distortion from the first signal to obtain a second signal (blocks 106,108,109, 212, and 218 constitute as an approximation of the pulse shaping distortion; block 218 produces a second signal; Col 7, L36-48). Processing the second signal to obtain a user signal (block 216 produces a signal $\hat{a}_n$; abstract), wherein extracting comprises applying an equalization (DFE use LMS algorithm; Col 7, L16-20). This means that Hafeez et al's equalization is performed between the first (received signal includes pulse shaping distortion) and second signal (pulse shaping distortion extracted). The claim requires a

third signal, which corresponds to the first signal, including no pulse shaping distortion and consists of only CDMA codes. Hafeez et al disclose a decision feedback equalizer (DFE), but did not explicitly show a DFE structure. It is well known that a DFE uses previous detector decision as a feedback signal to eliminate ISI that are currently being demodulated. This feedback signal constitutes as the third signal, while the input to the DFE equalizer is the first signal and the output of the DFE is the second signal. Thus indicates the "equalization between the second signal and a third signal corresponding to the first signal". Wei et al. was introduced in rejection for this purpose. Wei et al discloses a CDMA receiver comprises an adaptive equalizer uses a LMS algorithm (Col 4, L53-67). The equalizer is applied between an output signal (818 in Fig. 8; "second signal" as claimed) and a feedback signal (signal 826 produced by adaptive algorithm 822; "third signal" as claimed) corresponding to a received signal (signal 804; "first signal" as claimed). The equalizer (810) is applied between the output signal (818) and the feedback signal (826). In other words, the equalization is applied between the second signal and the third signal corresponding to the first signal. Applicant states that the adaptive algorithm 822 updates the equalizer filter weight 826 that are used by the equalizer 810. It is clear and understood that weighting factor control signal is free of pulse shaping distortion. In addition, the estimated pilot signal (824) provided to the adaptive algorithm (822) is code division multiplexed (CDM) pilot. The pilot signal is used to calculate the weighting factors by adaptive control. It is well known in the art that a CDM communication system employee PN code. Thus, the "third signal" consists only of CDMA codes. Therefore, it is obvious to one of ordinary skill in the art to apply

Hafeez's invention in a CDMA communication environment and combine the adaptive equalizer teaching of Wei et al. By doing so, apply an equalization between the second and a third signal corresponding to the first signal, the third signal including no pulse shaping distortion and consisting only of binary code division, multiple access (CDMA) codes. Compensating interference and pulse shaping distortion in a CDMA communication receiver is achieved. Applicant also argues that Wei et al do not teach or suggest extracting an approximation of the pulse shaping distortion. This assertion is incorrect. Wei et al explicitly stated that the received signal contains distortions and the equalizer is used to correct such distortion (Col 8, L39-49). Therefore, combine the teaching of Hafeez et al. with Wei et al are reasonable and meet the claimed limitations.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 5, 8-12, 14, 16, and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hafeez et al. (US 6,920,191) in view of Wei et al (US 7,272,176).

a) Regarding to claim 1, Hafeez et al disclose a signal processing method comprising:

receiving a first wireless communication signal, the first signal including pulse shaping distortion produced by pulse shaping (signal received from antenna 102 in Fig. 2; it is inherent that distortions are introduced along with received signals);

extracting an approximation of the pulse shaping distortion from the first signal to obtain a second signal (blocks 106,108,109, 212, and 218 constitute as an approximation of the pulse shaping distortion; block 218 produces a second signal; Col 7, L36-48); and

processing the second signal to obtain a user signal (block 216 produces a signal ân; abstract); wherein extracting comprises applying an equalization (DFE use LMS algorithm; Col 7, L16-20).

Hafeez et al did not explicitly disclose a third signal in the equalization.

However, Wei et al discloses a CDMA receiver comprises an adaptive equalizer uses a LMS algorithm (Col 4, L53-67). The equalizer is applied between the second signal (818 in Fig. 8) and a third signal (interpreted as output of the adaptive algorithm block 822) corresponding to the first signal (the received signal 804), the third signal including no pulse shaping distortion and consisting only of binary code division multiple access (CDMA) codes (Col 9, L54-Col 10, L19; weighting factor control signal is free of pulse shaping distortion. A CDM communication system employee PN code). It is well known that adaptive equalization compensate for interference and noise caused by the transmitter and the channel (Col 4, L51-54). Moreover, Hafeez et al's invention can be applied to CDMA communication system (Col 10, L3-9). Therefore, it is obvious to one of ordinary skill in the art to apply Hafeez's invention in a CDMA communication

environment and combine the adaptive equalizer teaching of Wei et al. Thus indicates apply an equalization between the second and a third signal corresponding to the first signal, the third signal including no pulse shaping distortion and consisting only of binary code division, multiple access (CDMA) codes. By doing so, compensate interference and pulse shaping distortion in a CDMA communication receiver system.

b) Regarding to claim 2, Hafeez et al disclose further comprising:

conducting a signal-user detection (wireless communication system; Col 1, L6-16); and

obtaining an amplitude estimate and a symbol delay for a user in a frame (213 and 218 in Fig. 2).

c) Regarding to claim 3, Hafeez et al disclose wherein the second signal has insignificant or no pulse shaping effects (Col 8, L12-14).

d) Regarding to claim 8, Hafeez et al disclose wherein extracting comprises subtracting an approximately known function of pulse shaping from an unknown function with a time-varying channel function (Col 6, L1-Col 7, L19).

e) Regarding to claim 9, Hafeez et al disclose a signal processing method comprising:

receiving a first wireless communication signal, the first signal including non-channel distortion produced by a non-channel function (signal received from antenna 102 in Fig. 2; it is inherent that distortions are introduced along with received signals);

extracting an approximation of the non-channel distortion from the first signal to obtain a second signal that includes a time-varying channel function (blocks

106,108,109, 212, and 218 constitute as an approximation of the non-channel distortion; block 218 produces a second signal; Col 7, L36-48); and

processing the second signal to obtain a user signal (block 216 produces a signal ân; abstract); wherein extracting comprises applying an equalization (DFE use LMS algorithm; Col 7, L16-20).

Hafeez et al did not explicitly disclose a third signal in the equalization.

However, Wei et al discloses a CDMA receiver comprises an adaptive equalizer uses a LMS algorithm (Col 4, L53-67). The equalizer is applied between the second signal (818 in Fig. 8) and a third signal (interpreted as output of the adaptive algorithm block 822) corresponding to the first signal (the received signal 804), the third signal including no pulse shaping distortion and consisting only of binary code division multiple access (CDMA) codes (Col 9, L54-Col 10, L19; weighting factor control signal is free of pulse shaping distortion. A CDM communication system employee PN code). It is well known that adaptive equalization compensate for interference and noise caused by the transmitter and the channel (Col 4, L51-54). Moreover, Hafeez et al's invention can be applied to CDMA communication system (Col 10, L3-9). Therefore, it is obvious to one of ordinary skill in the art to apply Hafeez's invention in a CDMA communication environment and combine the adaptive equalizer teaching of Wei et al. Thus indicates apply an equalization between the second and a third signal corresponding to the first signal, the third signal including no pulse shaping distortion and consisting only of binary code division, multiple access (CDMA) codes. By doing so, compensate interference and pulse shaping distortion in a CDMA communication receiver system.

f) Regarding to claim 10, Hafeez et al disclose wherein the non-channel function comprises a transformation function (106 and 108 in Fig. 2).

g) Regarding to claim 11, Hafeez et al disclose further comprising:

conducting a signal-user detection (wireless communication system; Col 1, L6-16); and

obtaining an amplitude estimate and a symbol delay for a user in a frame to obtain the approximation of the non-channel distortion (213 and 218 in Fig. 2).

h) Regarding to claim 12, Hafeez et al disclose wherein the second signal has insignificant or no non-channel distortion (Col 8, L12-14).

i) Regarding to claim 16, Hafeez et al disclose wherein extracting the approximation of the non-channel distortion from the first signal comprises subtracting an approximately known non-channel distortion from an unknown distortion of a time-varying channel function (Col 6, L1-Col 7, L19).

j) Regarding to claim 18, Hafeez et al disclose a signal processing system, comprising:

a receiver for receiving a first signal for wireless communication (signal received from antenna 102 in Fig. 2);

a tracking device for obtaining an amplitude estimate and a symbol delay for a user (106,108,109, 212 and 218 in Fig. 2);

an approximating device, coupled to the tracking device, for providing an approximation of non-channel distortion in the first signal, wherein the non-channel distortion is produced by a non-channel function (213 in Fig. 2; Col 8, L12-14); and

a signal-extracting device, coupled to the approximation device, for extracting the approximation of the non-channel distortion from the first signal to obtain a second signal that includes a time-varying channel function (DFE use LMS algorithm; Col 7, L16-20).

Hafeez et al did not explicitly disclose a third signal in the equalization device.

However, Wei et al discloses a CDMA receiver comprises an adaptive equalizer uses a LMS algorithm (Col 4, L53-67). The equalizer is applied between the second signal (818 in Fig. 8) and a third signal (interpreted as output of the adaptive algorithm block 822) corresponding to the first signal (the received signal 804), the third signal including no pulse shaping distortion and consisting only of binary code division multiple access (CDMA) codes (Col 9, L54-Col 10, L19; weighting factor control signal is free of pulse shaping distortion. A CDM communication system employee PN code). It is well known that adaptive equalization compensate for interference and noise caused by the transmitter and the channel (Col 4, L51-54). Moreover, Hafeez et al's invention can be applied to CDMA communication system (Col 10, L3-9). Therefore, it is obvious to one of ordinary skill in the art to apply Hafeez's invention in a CDMA communication environment and combine the adaptive equalizer teaching of Wei et al. Thus indicates apply an equalization between the second and a third signal corresponding to the first signal, the third signal including no pulse shaping distortion and consisting only of binary code division, multiple access (CDMA) codes. By doing so, compensate interference and pulse shaping distortion in a CDMA communication receiver system.

k) Regarding to claim 19, Hafeez et al disclose wherein the non-channel function comprises a transformation function (106 and 108 in Fig. 2).

l) Regarding to claims 5 and 14, Hafeez et al disclose wherein extracting comprises applying a decision feedback equalization between the second signal and an approximation of the third signal based on a current decision (DFE use LMS algorithm; Col 7, L16-20. Also see Fig. 8 of Wei).

4. Claims 6-7, 15, 17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hafeez et al. (US 6,920,191) in view of Wei et al (US 7,272,176), and further in view of Shattil (Pub No.: US 2002/0034191).

Regarding to claims 6-7, 15, 17, and 20, Hafeez and Wei et al disclose an equalization (LMS Col 7, L16-20), and all the subject matters above except for the specific teaching of at least one order of perturbation to adjust the approximation of the pulse shaping distortion.

However, Shattil discloses a wireless communication system comprise an approximate solution that is obtained from a first-order perturbation calculation ([0678]). Therefore, it is obvious to one of ordinary skill in art to combine the teaching of perturbation algorithm taught by Shattil in the pulse shaping distortion compensator of Hafeez and Wei et al. By doing so, provide interference improvement in a wireless communication system.

Conclusion

5. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eva Y Puente whose telephone number is 571-272-3049. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Eva Yi Puente
/E. Y. P./
Examiner, Art Unit 2611

March 6, 2009

/Chieh M Fan/
Supervisory Patent Examiner, Art Unit 2611